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Santa Clara Tunnel Landslide Repair Project Revegetation Plan

(Project No. 912203)

Prepared for:
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

and

Monterey Peninsula Engineering
192 Healy Avenue
Marina, CA 93933

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Prepared by:
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Revised July 17, 2001

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I. EXECUTIVE SUMMARY

The purpose of this restoration plan is to provide the methods and techniques for the erosion control, and revegetation, and mitigation for the Santa Clara Landslide Repair Project (Project No. 912203). Monterey Peninsula Engineering (MPE) will perform the slope stabilization and repair work.

Monitoring and performance standards are included to assess project performance and mitigation compliance. Restoration maintenance is to occur until planted areas are revegetated and established herbaceous plants are self-sustaining.

Project Summary

The proposed project involves repair of an enlarging landslide in order to prevent damage to the Santa Clara Conduit, a water supply pipeline (and tunnel) owned by the U.S. Bureau of Reclamation but operated and maintained by the Santa Clara Valley Water District. The pipeline (and its tunnel) are used to deliver raw water from San Luis Reservoir to District water treatment plants. The conduit was built as part of the Central Valley Project during the early to mid-1980s. The landslide is a result of tunnel excavation materials being disposed of by leaving spoil piles. Secondarily, the repairs will prevent additional damage to private grazing land, stock ponds, and drainage ditches. The slide has already displaced some fencing, damaged trees, and moved into one of the two existing stock ponds at the bottom of the slope.

The proposed project involves repair of an enlarging landslide in order to prevent damage to the Santa Clara Conduit, a water supply pipeline (and tunnel) owned by the U.S. Bureau of Reclamation but operated and maintained by the Santa Clara Valley Water District. The pipeline (and its tunnel) are used to deliver raw water from San Luis Reservoir to District water treatment plants. The conduit was built as part of the Central Valley Project during the early to mid-1980s. The landslide is a result of tunnel excavation materials being disposed of by leaving spoil piles. Secondarily, the repairs will prevent additional damage to private grazing land, stock ponds, and drainage ditches. The slide has already displaced some fencing, damaged trees, and moved into one of the two existing stock ponds at the bottom of the slope.

The proposed project involves stabilizing the conduit by re-grading and providing a new staging area. The proposed project would also include excavation and removal of the tunnel spoils pile, except at the base of the hill, where the spoil material will be left in place. The conduit would be supported by a retaining structure and a small engineered embankment. Realignment of the access road and a vehicle parking and temporary access road would be constructed through the pasture east of the slide area.

Monterey Peninsula Engineering is contracted with SCVWD to complete the landslide repair, remove the excess fill, and stabilize both the landscape repair area and the fill receiver site. The proposed fill receiver site is located on the Bourdet property in an adjacent area approximately 200m from the landslide repair site which is dominated by non-native grasses and forbs. The amount of fill received by the site will be 36,000 cubic meters with a fill area foot print size of 4 acres. The associated slopes shall be at a 2:1 maximum ratio. The fill will begin at the outboard edge of the original designs' haul road and end about 6m uphill for the toe of the valley/crease in the hill. See appended map for proposed new contours.

Both the landslide repair area and the fill receiver site will be seeded with a mix of native grasses and forbs and mulched with weed-free rice straw. This project will result in the stabilization of the landslide, protection of sensitive pond and wetland habitat, the enhancement of the grasslands with the planting of native grasses and forbs, and the increase of forage value on the site for the Bourdet cattle operations.

The project does not cause significant adverse effects related to aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology/water quality, land use/planning, mineral resources, noise, population/housing, public services, recreation, transportation and circulation, and utilities and in addition, substantial adverse effects on humans, either direct or indirect, will not occur.

A. Project Impacts

The total project area is approximately 12 acres (5 hectares). The area to be revegetated will be substantially less, as the total area within the exclusionary silt fencing will not be disturbed. The area to be revegetated will be approximately 2.5 hectares.

B. Project goals

1. Prevent erosion resulting from the repair of a landslide.

2. Create self-sustaining grassland habitat that will require little long-term maintenance or dependence on irrigation and use of fertilizers and will provide good forage value.

3. Provide a maintenance, monitoring, and reporting program that will evaluate the relative success or failure of the roadside revegetation.

C. Summary schedule

Repair work by MPE on the site shall start at the issuance of grading permits. Exotic pest plant control and replanting began with approval of the revegetation plan, all permits and approvals for the project and the completion of the landslide repair. The projected repair start date is projected to be August 1, 2001. Revegetation work shall begin after finalization of MPE work in approximately mid September 2001 and be complete prior to October 15.

D. Rare and Endangered Species

The are no listed plant species present on the project site. A survey for potentially occurring San Joaquin kit fox (*Vulpes macrotis mutica*) and Burrowing owl (*Athene cunicularia hypugea*) will be required prior to construction by a qualified biologist. Neither species had been observed on the site, but there are burrows that could potentially provide habitat. Winter pitfall trapping for California tiger salamanders and California red-legged frog was done during the rainy season of 2000 and 2001 by Brian Mori under an agreement with the US Fish and Wildlife Service.

As referenced as Task 1 of the Contract Change Order 1 addressed to MPE 10/9/2000 (appended), winter pitfall trapping has been conducted. Subconsultant Brian Mori monitored the traps along the exclusionary fencing for 25 nights beginning January 8 and ending March 26. The Contract Change Order 1 requests that trapping was done through March 30 but as there was no rain after March 26 so that was the last day of trapping. Only one juvenile California red-legged frog was found inside a trap near the road entrance on 4 March and was moved outside of the project area exclusionary fencing. No California tiger salamanders were found. Task 2, consultation with regulatory agencies regarding disposal of non-native tiger salamanders, is not applicable, as there were no salamanders found during the study. Per Task 3, Mr. Mori and MPE have been diligent in repair of the exclusion fencing that was needed to repair damage from cows and wild pigs.

Brian Mori has prepared a detailed report of the trapping study (appended). Silt fencing to protect sensitive wetland habitat will remain in place and under continued maintenance until completion of the project. As there is no impact to rare of endangered species within the project area, no further mitigations regarding sensitive amphibians should be required upon completion of the project.

II. DESCRIPTION OF PROJECT AND AFFECTED AREA

A. Location

The location of the project is approximately 4,000 ft west of State Highway 152 in the area known as Casa de Fruta, in unincorporated Santa Clara County. See appended map.

B. Vegetation/habitat description

The project area generally consists of oak savanna and European annual grasses. There are a few remnant native bunch grasses present. The area is currently in operation as a cattle ranch. The goal of the project is to restore the site to a functional grassland that is stable, self sustaining, and has good forage value.

III. IMPLEMENTATION PLAN AND SPECIFICATIONS

A. Responsible parties

Santa Clara Valley Water District is the lead agency of this project. The repair project contractor is Monterey Peninsula Engineering (MPE).

B. Land shaping and grading - protection of biological resources

There has been silt fencing installed and maintained around the project site during the winter and spring of 2001.
During road construction, all trees should be protected. The shrubs adjacent to the road should also be protected.

C. Soil/substrate/growth media

1. Testing. Testing shall be conducted for soil on the restoration receiver site. The soils shall be tested for nutrient deficiencies and mechanical properties. Soils shall be amended if found to be deficient. Restoration measures shall be adapted to any soils, constraints, or deficiencies.

2. Salvaging, stockpiling, replacing. During the grading and vegetation removal process, native plants will be salvaged and collected. Plants with a high feasibility of successful transplanting will be harvested and propagated at a qualified native plant nursery. The main target plants of the salvage program shall be valley oak savanna species.

3. Decompaction. Where parent soils are compacted, ripping will be implemented in preparation for seed and plant establishment. Hand crews on the steep slopes will accomplish scarifying of compacted soils.

4. Amending soils. Soil amendments, such as native mulch and/or mychorizal fungi will be utilized in the container plants for the restoration program. Plant response to various levels of nutrients and amendments shall be analyzed.

5. Mulching (inclusive of native mulches). Clean rice straw shall be used as cover for erosion control and for covering planted seed on the steep and/or difficult locations. Straw shall be used at a rate of 4,500 kg per hectare. Jute netting will be used to anchor straw mulch if needed on the steeper slopes.

6. Fertilizing. Fertilizer shall be specified for restoration area if required as a result of soil nutrient analyses. A commercial fertilizer shall be ammonium phosphate and contain a minimum of 12 percent nitrogen, 20 percent phosphorus, and 0 percent potash, uniform in composition, dry and free flowing, pelleted or granular.

D. Weed eradication. Weed control is the most important process for successful establishment of native plants, and will often result in natural regeneration of native plant populations. The pest plants can be controlled through the use of a post-emergent herbicide (such as Round-up®). The exotic species should be hand-mowed and sprayed after initial reemergence of new growth.

Specific goals and objectives for weed control are as follows:

- Limit the spread of invasive, exotic plant species.
- Support the re-establishment of existing native plant species and their future progeny by limiting unnatural competition by exotic species.
- Utilize selective spot spraying of approved post-emergent herbicides and hand pulling as the primary weed controls.
- Physically protect native plant species growing in the midst of exotic weed species during spray operations.

a. Weed control procedures. Application of post-emergent herbicide with backpack sprayers will be used.

b. The specified spray mix is as follows:
Herbicide: active ingredient *glyphosate* (Round-up® or equal)
Water: clean and free of particulate matter (*glyphosate* absorbs on clay particles)
Dye: Blazon agricultural dye
Ingredient rates as specified by manufacturer.

Personnel providing spray services shall be fully trained in such operations, and shall wear all required protective clothing. The spray contractor shall carry all licenses and insurance required by the State of California and all other governmental agencies having jurisdiction. The spray contractor shall also be responsible for notification of all parties regarding application of chemical herbicide, as required by law.

c. Target invasive non-native species to control: Yellow Starthistle. First introduced to California in mid-1800, yellow starthistle *(Centaurea solstitialis)* is now considered a major warm-season weed in California. Methods of prevention and control can be achieved through cultivation, mowing, grazing, burning, revegetation, and chemical applications. Control of yellow starthistle may be accomplished by limiting vehicular traffic, reducing bare soil, late grazing, and mowing in the early flowering period.

d. Protection of native plant species during herbicide application: Prior to the application of herbicide, the spray contractor shall become thoroughly familiar with native plant species that are growing in exotic weed colonies, which are to be protected. The monitoring biologist is required to provide familiarity training using photographs, on-site identification, marking with flagging tape, and any other techniques necessary to convey specific identification. The contractor shall thereafter provide any and all appropriate measures necessary to protect identified trees and other native plants, such as shielding of plants with rolled plastic sheeting, while adhering to all applicable health and safety codes for worker protection.

E. Plant materials

All plant material requirements are provided in the following tables. Plant species, and application rates are provided. Plants shall be from local ecotypes.

1. Propagule source (e.g. commercial, custom collect). Commercial quantities of local and regional ecotypes will be used for all restoration and erosion control applications. All plant material from outside of Santa Clara County shall have a clearance certificate from the County Agricultural Commissioner.

2. Planting rates, densities, spacing. Planting rates and densities shall target successful stand establishment of the species provided in the restoration plant list.

3. Planting methods details. Two methods will be utilized to establish vegetation in the Restoration Area. Methods to establish native vegetation will follow proven and successful procedures derived from many years of successful vegetation establishment.

a. Direct planting. Nursery grown Valley Oak (*Quercus lobata*) transplants from locally collected acorns shall be planted. The plants shall be placed in excavated basins and backfilled. The soils shall be firmly compressed at the base of the plant to preserve moisture.

1. Utilize a dibble, trowel, shovel, auger or other specialized tool, open a hole twice as deep and as wide to accommodate the live plant.

2. Place the live plant into the hole and compact the surrounding soil to "set" the plant.

3. Saturate the soil immediately surrounding the plant with water to a depth of 14".

Container Plants

Scientific Name	Common Name	Size	Quantity
Quercus lobata	Valley Oak	5 gal	15

The Contractor shall notify the Engineer at least 2 days prior tot he delivery date of the plant materials. Installation of oak trees shall occur during the fall or early winter months to take advantage of seasonal rains. Oak planting location shall be determined in the field by MPE and the Revegetation Contractor after final grading is complete. A map display with planing location shall be submitted to and approved by SCVWD prior to installation of Valley oak trees.

b. Seeding and Tacking. Seeding shall be performed by hand broadcasting. Seed shall be uniformly mixed first and then hand broadcast uniformly over the entire site at a rate of 61.6 kg per hectare. Straw mulch will then be applied at a rate of 4,500 kg per hectare. To prevent removal by wind, an M-Binder (a plantago based tackifier) and water mixture will then be applied on the seeded and straw area at rate of 27 to 37 kg per hectare. Areas that are accessible will be tracked with a bulldozer or similar tracked vehicle or with a mulching roller or straw crimper. This provides good soil-to-seed contact, and also creates microi-topography that creates rain catchments and encourages seedling growth. On areas that are not accessible by equipment, mulch shall be anchored using hand tools such as spade, shovel, and other suitable equipment. Straw on steeper slopes will be anchored using fiber netting (jute netting). Mulch net shall be durable and capable of withstanding a minimum of one-years' weathering without disintegration. Anchor pins shall be U-shaped staples with a minimum of 2 mm diameter and length of 150 mm.

Straw: Straw shall be new straw derived from rice and be free of mold and noxious weed seed. Straw shall be furnished in air-dry bales. Evidence shall be furnished that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the County in which it is to be used is delivered to the site of the work.

Seed Mix

Scientific Name	**Common Name**	**Application Rate**
Bromus carinatus	California brome	11.2 kg/ha
Hordeum californicum	Prostrate California Barley	11.2 kg/ha
Melica imperfecta	California melica	11.2 kg/ha
Nasella cernua	Foothill needlegrass (San Juan Bautista)	11.2 kg/ha
Nassella pulchra	Purple needlegrass (San Juan Bautista)	11.2 kg/ha
Sisyrinchium bellum	Blue-eyed grass	1.5 kg/ha
Trifolium facatum	Sour clover (Hollister)	1.8 kg/ha
Trifolium gracilentum	Pinpoint clover (Hollister Hills)	1.8 kg/ha

Note: The species to be seeded varies somewhat from the original specifications set forth by Dames & Moore in the June 2000 SCVWD report. These species specifications herein are based on the native plants that are present on the site, the species from the surrounding area, the commercial availability of seed, and the goal of good forage value for the existing cattle ranch. As per consultation with SCVWS, the seeding rate is higher than what would be typical because installation shall occur in the summer, and the higher seeding rate allows for seed loss due to bird and rodent predation while the seeds are waiting for the fall rains.

Seed shall be delivered to the site in manufacturer's standard containers bearing original labels and showing quantity, analysis, and name of manufacturer. Seed shall be of a quality of that has a minimum pure live seed content of 80 percent, and weed seed shall not exceed 0.5 percent of the aggregate of pure live seed and other material.

Submittals

The Revegetation Contractor shall submit the following prior to implementation of the revegetation plan.

1. Clearance certificate from the County Agricultural Commissioner (if plants come from outside the County)
2. Inspection certificates accompanying each shipment of plants or seeds.
3. Notification to the Engineer at least 10 days prior to shipment of plants.
4. Product data and specifications for fertilizer

5. Fencing and signage. Protective fence should not be needed as the planting areas are on slopes with virtually no pedestrian or vehicular traffic. If extensive damage is done to the revegetation area by wild pigs or cattle, protective fencing may be needed until seeded plants are established. The outer exclusionary silt fencing currently in place will remain to protect wetland habitat during the repair project, and will be removed upon completion of the revegetation plan.

IV. SITE MAINTENANCE

A. Overview

Site maintenance will include inspection and reporting frequency, invasive exotics control, plant maintenance/replacement as needed and irrigation and soil amendments (if needed).

1. Invasive weed control. Disturbance-loving pioneer species and weeds colonize disturbed sites creating cover and mulch over slower growing native plants. In the project area, existing non-native grasses, herbaceous plants, and weeds will most likely advance into the restoration site. These plants include the previously mentioned forbs such as yellow starthistle. Exotic pest plant control will be required within the restoration area and is critical to the establishment of planted plants as well as native existing or colonizing plants.

2. Plant maintenance and replacement. Maintenance of planted propegules will include weeding around the base of the planted trees, protection from herbivory, and fertilization if soils analyses require. If necessary, plants will be replaced with the same species or a more suitable native species during the first three years of growth.

3. Irrigation and soil amendments. No irrigation shall be used for the establishment and management of vegetation. Natural rainfall should provide adequate moisture. Native plants thrive better in the long-term without irrigation. If it is necessary for plant survival, supplemental water will be provided. Soil analysis will be made to determine if fertilization is necessary and the level of application. At this time, the only soil amendment anticipated is use on non-reproductive exotic vegetative matter (rice straw) as mulch.

B. Adaptive management

The objective of the restoration and enhancement is to provide information regarding best practice vegetation establishment and management. Monitoring the results will help determine alternative vegetation establishment and management based on the relative success or failure of planting and care. Adaptive management will focus on implementation costs, efficacy of exotic plant control, and levels of success or failure of the prescribed management. If prescribed planting or weed control programs fail to achieve anticipated trends or thresholds of success, alternative management will be prescribed.

C. Evaluation and reporting of maintenance activities

Maintenance activities shall be monitored and a report prepared describing the results of the restoration program. Maintenance activities will be logged with each site visit and summarized in the monitoring reports.

V. PERFORMANCE STANDARDS

A. Standards for project element

1. Qualitative standards (e.g. photo reference points, visual/aesthetic quality). Qualitative standards for the restoration program focuses on the condition of the habitat prior to construction of the project and the establishment of representative species selected from the pre-construction plant communities. Qualitative standards will be measured by aesthetic quality of the recreated habitat relative to pre-construction habitat conditions.

Photo monitoring can be done simply and inexpensively and can provide illuminating observations on a time scale that we don't naturally appreciate. Monitoring points will be established at key locations throughout restoration site. At each monitoring point, a permanent marker will be installed. The permanent datum will be installed at the ground level consisting of a small t-bar stake.

2. Quantitative standards (mortality of planted plants, weed control). Plant establishment and exotics coverage will be measured by field survey. Corrective actions may be required during the first three years of the restoration effort. If mortality of selected native plant species exceeds 15% of planted individuals, (due to improper planting, or disease but not due to natural occurrences, natural storms and flood events,) then corrective actions are required. Vegetative cover of herbaceous species is a good index to the amount of light and soil nutrients being captured by a member of the community. If absolute canopy cover of herbaceous weed species exceeds 10%, then corrective action is required.

3. Corrective action for mortality of individually planted native species will include an analysis to determine the cause of mortality. If a cause unrelated to the naturally occurring cause described below can be established, that information will be used to select and re-install replacement individuals. Corrective action for abundant, non-native weeds will vary with the species, but in all cases will require appropriate weed control. Methods of weed control are discussed above. Corrective action for loss of large woody species will include an analysis of the cause of mortality or lack of growth. Poorly performing species will be replaced.

VI. MONITORING

A. Goals

The general monitoring format will be monitoring reports annually in years 1, through 5*.

* [Note: Year 1 will be defined as ending approximately 1 year after installation is signed off by Santa Clara Valley Water District.]

1. Avoid and protect the existing native plant population from impacts.

2. Determine exotic species abundance and efficacy and costs of management control procedures.

3. Assess the percent cover, numbers, and population health of native erosion control and planted native species within the restoration site.

4. Determine efficacy of erosion control measures.

B. Description of monitoring methods

1. Herbaceous vegetation and erosion control. A sampling regime will be established so that at least two sampling plots will be included. At a beginning point of each plot, a point will be determined in the field, and from this point, a 50 meter measuring tape along the contour will be laid out. This line represents the centerline of a 50 x 20 meter sampling plot (fig 1). The heading of the line will be noted for future monitoring reference. At every 2.5 meters along the line, a steel quadrat (0.1 m sq.) will be placed. The quadrat is painted along the edges to show 6 cover classes (0-5%, 6-25%, 26-50%, 51-75%, 75%-95%, 95-100%). Percent cover for each species will be determined by averaging estimated basal area of each species within a quadrat. Midpoints of cover classes will be assigned to each observation and averaged twenty quadrats at each sampling location. This method is commonly used in vegetation sampling (Bonham, 1989) and in particular was developed by Daubenmire (Daubenmire, 1959).

Monitoring shall occur combined with maintenance and replacement of failed plantings and annually for years 1 through 5 in late spring, during the months of May or June.

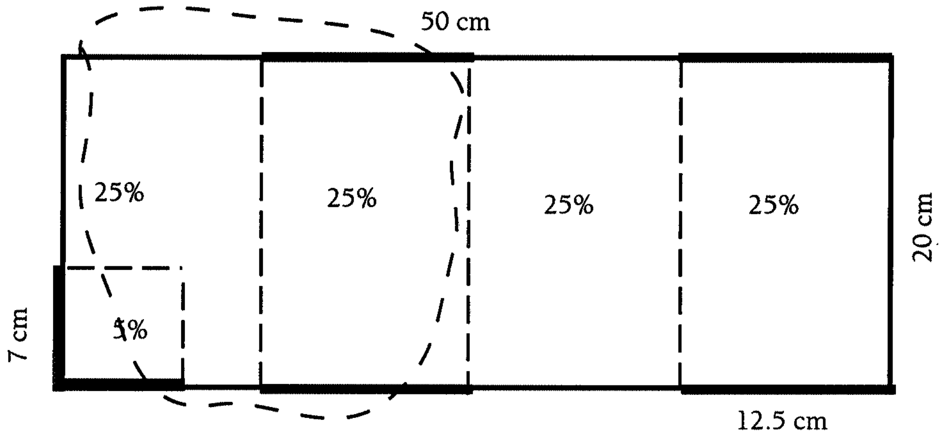
C. Monitoring Procedures

1. Determine exotic species abundance and management control procedures: Visually inspect the restoration area for presence of exotic species prior to and after exotic control activities. List all exotic species by percent cover (Daubenmire) values. Compare percent cover trends before and after each weed

control event. Record and report on weed control timing, frequency, height, and general effects on erosion control seedlings and on natural native plant regeneration.

2. Assess percent cover values: Every year beginning in year one, assess the percent cover, numbers, and population health and efficacy of native erosion control and planted native species within the restoration site using the pre-construction habitat condition as a baseline for comparison. List all species by percent cover values.

Daubenmire Cover Method.

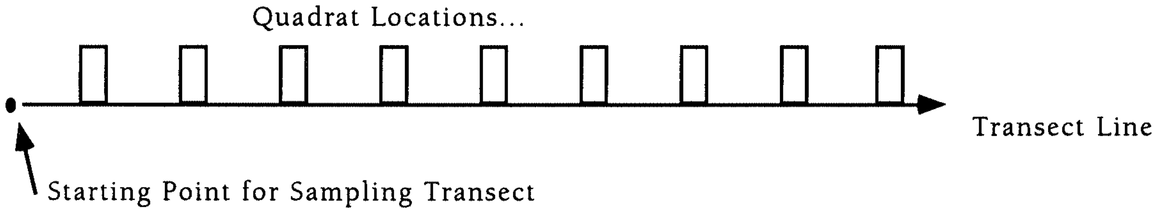


A steel frame, made from .25" wire, is welded in a flat rectangle to dimensions of 20 cm x 50 cm (area = .10 m^{2}). The frame is then painted to show areas of 5%, 25%, 50%, 75%, as 95% (see above).

This frame is place on the ground and cover of each species is summed visually and placed in the following categories;

Category	Mid Point
1- 0-5%	2.5
2- 6-25%	15.5
3- 26-50%	38
4- 51-75%	44.3
5- 76-95%	85.5
6- 96- 100%	98

For example, the plant shown in outline, as seen from above, covers enough ground for category 3. In the field, only the score for each species in each quadrat is recorded. Scores for species on each quadrat are later assigned a numeric value of the mid-point of the range, and then averaged. At least 20 quadrats must be read along a transect placed in each larger sub-unit.



D. Reporting requirements

Reports will be submitted to Santa Clara Valley Water District. Monitoring reports shall be provided once per year for years 1 through 5. The report will include 1) observational and analytical data, 2) photographic documentation, and 3) notes pertaining to the success or failure of the restoration activities and, 4) management recommendations.

VII. REMEDIAL MEASURES

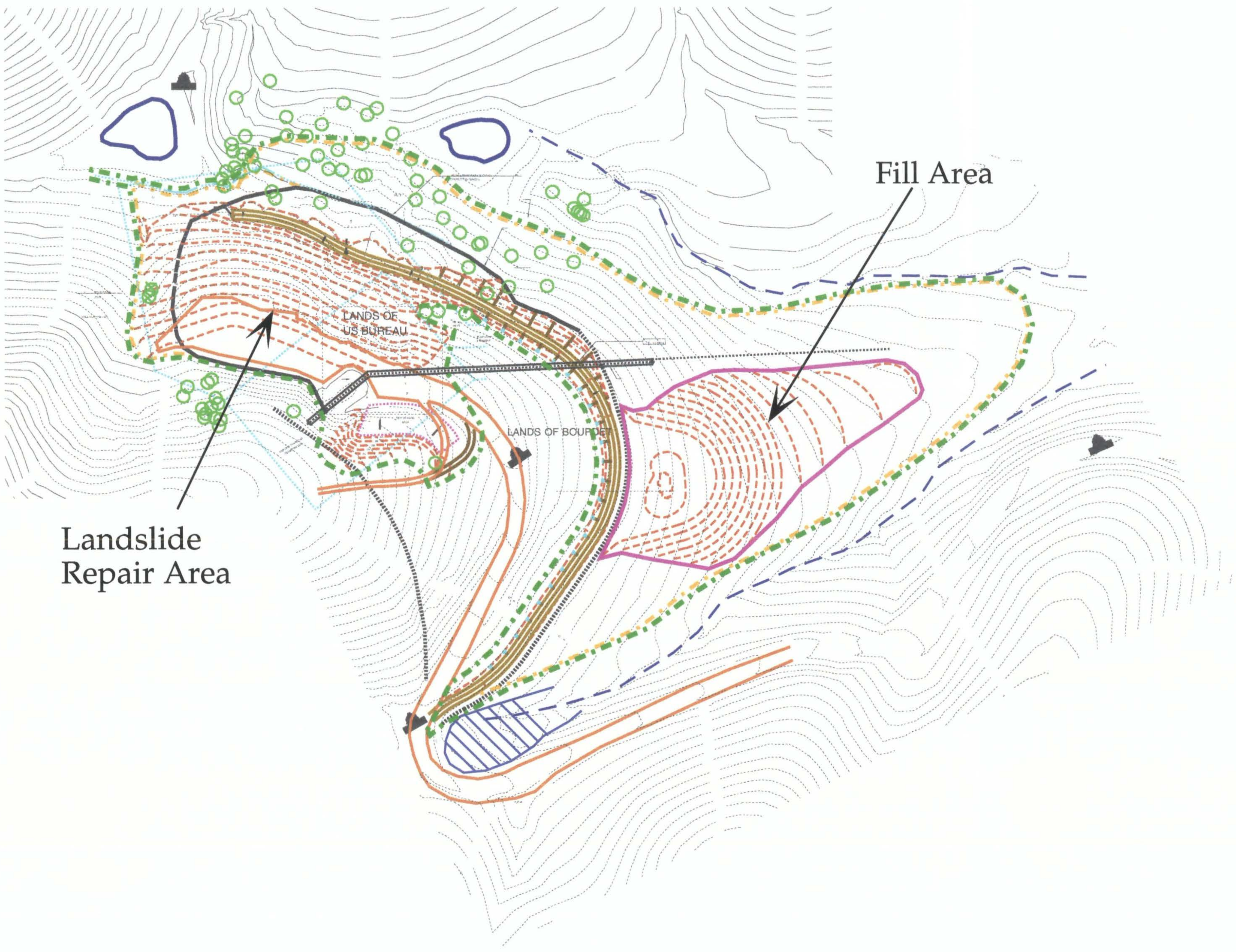
A. Criteria for implementation

The success criteria for the revegetation project are based on meeting objectives pertaining to the establishment of native grasses, shrubs, and trees. The habitat to be created is comprised of native species representing upland prairie habitat.

1. Success will be determined by mortality. For the first three years, mortality of selected native plant species of over 15% of planted individuals not caused by natural occurrences will indicate corrective actions are required. Mortality of any specified container plants will require a 1:1 mortality replacement ratio the first 3years to achieve the specified planting design composition, number, and frequency of native species.

2. Success will be determined by fecundity. Any natural native plant species or habitat re-generation and/or recruitment will be measured and applied to the required species list and area to be restored over the monitoring period.

3. Efficacy of weed control will be analyzed to determine the effects of the management on the establishment of a trend toward native plant diversity and cover and a decrease in exotic species.



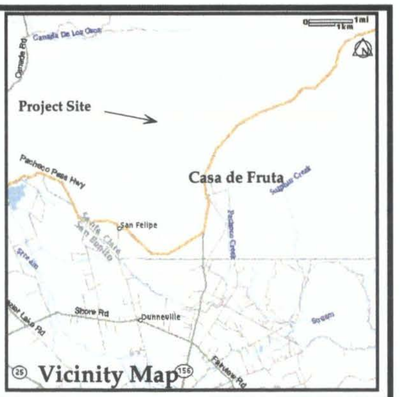
Legend

▢	Area to be Revegetated
▢	Existing Contour
▢	New Contour
○	Oak Trees
▢	Existing Road and Staging Area
▢	Temporary Road to be Revegetated
▢	Silt Fencing - To Remain in place with continued maintenance until completion of the project
▨	Wet Seep to be Protected
– –	Ephemeral Watercourse to be Protected
▢	Ponds to be Protected
▢	Fill Reciever Site

Santa Clara Tunnel Landslide
Repair Project Revegetation Plan
(Project No. 912203)

Revegetaion Plan

Revised
May 21, 2001



Vicinity Map

RANA CREEK
HABITAT RESTORATION

Graphic Scale
50 0 50 100 meters

DISPOSAL SITE

Scope of Work

The Contractor shall perform fill and compation of the disposal site as shown on the Drawings and as specified in these Specifications.

Materials

Unacceptable material such as debris, concrete, exposed tree roots, lumber, or other objectionable materials shall be removed, by the Contractor, from the disposal area to be backfilled.

Unsuitable subgrade materials shall be defined as material the Engineer determines to be of such unstable nature as to be incapable of being compacted in accordance with the requirements of these Specifications.

Subgrade materials removed due to excess moisture content, which would otherwise be acceptable as backfill, may be used as backfill after drying to an extent approved by the Engineer. Excess moisture content shall not normally be a factor in determining unsuitable material.

Execution

Earthwork shall conform to Section 19 of the State Specifications except as modified herein. The current requirements of the State of California, Division of Industrial Safety, shall be adhered to.

All soil surfaces (except those cut areas) to receive fill shall be cleared and grubbed in accordance with Article 17.02 of these Specifications, scarified to a minimum depth of 150 mm, water conditioned, and compacted to a relative compaction of not less than 90 percent, in accordance with ASTM D1557, unless approved otherwise by the Engineer.

Care shall be exercised to prevent any excavation beyond designated limits as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer.

No grading shall occur beneath the dripline of any tree which is not to be removed unless stated on these plans, AGrading under this tree is approved.@

Compaction equipment shall be suitable for the soils to be compacted so as to consistently produce the required strengths throughout the compacted soil mass as required by these Specifications.

Fill work shall be done such that new and existing permanent improvements will not be damaged or subjected to settlement or horizontal movement. Contractor shall be solely responsible for the safety of all cut and fill operations.

The disturbance of areas outside the limits of the work shall be minimized.

The disposal site shall be graded and compacted to 90 percent relative compaction.

Areas disturbed in any manner not required for completion of the Work shall be graded and restored during construction to their original grade and profile.

Work shall be conducted in such a manner to reduce erosion/sedimentation to as little as

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Areas disturbed in any manner not required for completion of the Work shall be graded and restored during construction to their original grade and profile.

Work shall be conducted in such a manner to reduce erosion/sedimentation to as little as possible. Temporary and permanent erosion control measures shall be provided as soon as possible.

Testing

Compation of the disposal site shall be in 300 mm loose lifts, compaction of each lift to a minimum of 90 percent maximum dry density measured by ASTM D1557 and raking and hydroseeding the finished slope surface in accordance with Section 23 of these Specifications.

When backfill material is required to be compacted to a percent relative compaction, the percent relative compaction shall be determined and controlled in accordance with the requirements of ASTM Standard Test Method D1557. The field density shall be determined in accordance with the requirements of either ASTM Standard Test Method D1556, ASTM Standard Test Method D2922 or ASTM D5195 (as determined by the Engineer). The District, through its authorized testing consultant, will have tests performed as required during the progress of the work to determine compliance with the compaction requirements specified herein. The Contractor shall fully cooperate in the making of such tests and allow a reasonable time therefor.

The Contractor shall remove material as required by the Engineer in any area where compaction of the material, when tested, does not fully comply with these Specifications. The unsatisfactorily compacted material shall be promptly removed, after notification, and reworked or replaced with material that will conform to the specified measurements. All additional costs for such required removal, reworking or replacing, and recompaction of material including costs paid by the District to its authorized testing consultant for retesting to verify compliance shall be borne by the Contractor.

One compaction test will be required for every 100 cubic meters of fill placement for each source of material used and one moisture density test will be required for every 30 square meters of compacted material placed per lift.

Submittals

A. A detailed step-by-step procedure for the fill and compaction operations. The procedure shall include the sequence and locations of each operation, and shall be submitted to Engineer for review at least 10 days prior to the start of work.

B. As requested by the Engineer, the Contractor shall furnish samples of material available on-site. Samples may be requested at the initiation of work, and periodically as the work progresses.

C. Submit for Engineer review, specifications of equipment proposed for compaction and fill placement.

Santa Clara Valley Water District

CONTRACT CHANGE ORDER NO. 1

CONTRACT NO. C0471

Project: Santa Clara Tunnel Landslide Slope Stabilization Sheet 1 of 1 Sheets

Original Contract Amount: [redacted] Current Contract Amount: [redacted]

To Monterey Peninsula Engineering, 192 Healy Avenue, Marina, CA 93933 Contractor

You are hereby directed to make the herein described changes from the Drawings and Specifications or do the following described work not included in the Drawings and Specifications on this contract. **NOTE:** This change order is not effective until approved by the District Board of Directors.

Description of work to be done, estimate of quantities, and prices to be paid segregated between additional work at contract price, agreed price and force account. Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time.

Change requested by District

TIME EXTENSION

Item A: In accordance with **Article 5.05, Change in Contract Time**, the contract time of work will be extended by 195-calendar days. Consequently, the new contract completion date is July 20, 2001. In accordance with **Article 5.03, Change in Work**, it is mutually agreed that in compensation for the above extension of contract time, the contractor will provide the necessary labor, equipment, and materials to perform the following work from the date of this change order and until work commences on the site:

1. Secure all necessary environmental clearances and approvals for the selected soil disposal site. This shall include verification of state and federal collection permits. Forward a copy of the results to us upon submittal to Fish and Game and/or U.S. Fish and Wildlife.
2. Repair and maintain the existing exclusion area fencing as shown on the plans and in accordance with the applicable specifications and Exhibit 1 (attached). This work includes monitoring of the area and performing the necessary wildlife surveys, capturing, handling, and relocating of the animal prior to the start of construction.
3. Repair and maintain the existing landslide slope protection measures in accordance with the applicable specifications and the industry standards.

There will be no additional compensation for these changes. All wildlife functions shall be performed by a qualified biologist possessing the necessary permits required by regulations and in accordance with Exhibit 1.

Net Estimated Change in Costs Decrease $ XXXXXXXXXXXXXXXX or Increase $ XXXXXXXXXXXXXXXXXXXX

By the reason of this order the time of completion will be adjusted as follows: 195 days

Submitted by
Engineering Unit Manager, Construction Administration

Approval Recommended 10/19/00
Deputy ~~Administrative~~ Officer Operating Date

Approved
General Manager Date

Not Required
Chair/Board of Directors Date

We, the undersigned contractor, have given careful consideration to the change proposed and hereby agree, if this proposal is approved, that we will provide all equipment, furnish all materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

Accepted Date 10/19/2000 Contractor Monterey Peninsula Engineering

By Title Vpres

FMC121a

EXHIBIT 1

Exclusion Fencing and Pitfall Trapping for the California Red-legged frog and California Tiger Salamander

Due to their listing as special-status species, surveys for the California Red-legged frog and California Tiger Salamander were conducted as part of the original project in late 1998 and 1999. The purpose of these surveys was to characterize the project site and to determine the presence or absence of these two species. These studies confirmed the presence of both California Red-legged frogs and California Tiger Salamanders.

As part of informal consultation under the Federal Endangered Species Act, a site visit was conducted in May 1999 during which U.S. Fish and Wildlife Service and California Department of Fish and Game recommended exclusion fencing and pitfall trapping for California Red-legged Frogs and California Tiger Salamanders as mitigation for the proposed slope stabilization project. This mitigation measure has been incorporated into the project's environmental assessment document and will need to be implemented in order to make a finding of "less-than-significant impact with mitigation incorporated." If this mitigation measure is not incorporated, potential impacts to California Red-legged frogs and California Tiger Salamanders could occur, requiring additional environmental documentation and potentially triggering formal consultation under the Federal Endangered Species Act with the U.S. Fish and Wildlife Service.

Task 1: Winter Trapping

Contractor will hire the services of a qualified biological consultant to repair the existing exclusion fencing and conduct pitfall trapping.

The scope of work includes a 2000-2001 Winter trapping survey and relocation (in the project vicinity, but out of the immediate project area) of California Red-legged frogs and California Tiger Salamanders captured and report preparation. This work shall also include a contingency cost associated with unforeseen fence construction and maintenance activities (i.e., damage due to wind storms, heavy runoff, unstable slopes, and damage by cattle or wild pigs, etc.).

Timing of the fence installation is critical due to the movement of California Red-legged frogs and California Tiger Salamanders away from the ponds during the first significant rains of the Fall. Therefore, the fence will be repaired no later than mid-October, earlier if possible.

The existing drift fence will be repaired and pitfall traps installed on the project site by mid-October or earlier if possible. The fence will completely encircle the disturbance area as requested by the District. The purposes of the drift fence are (1) to capture and remove California Tiger Salamanders that may currently be residing in the slide area and (2) to block California Tiger Salamanders from moving into the slide area. The fence will be constructed of silt-fencing material in order to double as an erosion control fence-line, as requested by the District. Based on past experience with silt fencing, and due to the known presence of cattle and wild pigs in the area, on-going fence maintenance is expected. A 3-foot tall strip of fence material will be buried ½ foot into the substrate and fastened to wooden stakes spaced 15 feet apart for support. Pitfall traps will be installed every 50 feet along the inside of the drift fence. Traps will also be installed every 200 feet along the outside of the fence-line to reduce the chances of predation that can result from prolonged exposure of California Tiger Salamanders moving along the fence-line. Each trap consists of a two-gallon pot and plywood cover. Initially, the traps will be opened on each rain event from the first Fall rains of 2000 through March 30, 2001. A minimum of 25 survey nights are proposed. Depending on the actual number of rain days, additional surveys will be conducted as necessary. During rainy nights and nights immediately following rains, the pitfall traps will be opened and then checked the following mornings (hence the reliance of survey nights on rainfall events). Each California Tiger Salamander or California Red-legged frog captured will be sexed (if possible), measured, and photographed in the field. California Tiger Salamanders and California Red-legged frogs captured in the traps indicating movement towards the ponds will be relocated to the ponds whereas those captured in traps indicating movement away from the ponds will be relocated to an on-site location away from the slide work area and placed into ground squirrel burrows. Traps will be closed on days when no rain is anticipated. Bricks or heavy rocks will be placed on top of each plywood trap cover.

Due to the federally-threatened status of the California Red-legged frogs, authorization to move California Red-legged Frogs captured during the study must be obtained prior to initiation of the study. A project-specific letter of concurrence has been obtained from the U.S. Fish and Wildlife Service stating that no impacts to any federally-listed species, including California Red-legged frogs, are anticipated (September 1, 1999). Due to the state-protected status of California Tiger Salamanders and California Red-legged frogs, approval of the California Department of Fish and Game must be obtained by the permitted biologist. Project-specific conditions attached to the permit, related to the relocation of special status species, must be obtained.

Task 2: Consultation With Regulatory Agencies

Additional consultations with resource agencies will be conducted as may be necessary in the event that non-native Tiger Salamanders are found onsite. Suspected non-native Tiger Salamanders will not be released, but collected and disposed of according to the requests of the U.S. Fish and Wildlife Service and California Department of Fish and Game.

Task 3: Periodic Fence Inspection

All exclusion fencing shall be inspected for damages on a regular basis, not to exceed once every 2 weeks until work commences on the site.

BRYAN M. MORI
BIOLOGICAL CONSULTING SERVICES
1016 Brewington Avenue, Watsonville, CA 95076; Tel/FAX (831) 728-1043

April 11, 2001

David Seanez
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

RE: Santa Clara Valley Water District Tunnel Landslide 2000-01 Winter California Tiger Salamander Pitfall Trap Monitoring; File No. 142-03

Dear Dale:

This letter presents the results of the California tiger salamander (*Ambystoma californiense*; CTS) winter 2000-01 drift-fence monitoring program conducted at the Santa Clara Valley Water District (SCVWD) Tunnel Landslide project site, on the Bourdet Ranch, Santa Clara County. This study represents the second year of CTS monitoring at the project site. The monitoring program was implemented to minimize CTS from dispersing into the landslide work area, as well as to remove CTS residing within the work area, prior to ground disturbance associated with the landslide remediation, which is scheduled for spring/summer 2001.

METHODS

The 2000-01 CTS study utilized the same 3000-foot drift-fence used in the 1999 - 2000 study, but also included an additional ≈1000 feet of drift-fence trapline to encompass a spoils storage area, which was not included in the study during the previous year. The drift-fence trapline was installed by Monterey Peninsula Engineering (MPE) between 13 - 18 December 2000, using the specifications from the previous year's study, as a reference. The addition of the new trapline created two adjoining enclosures A and B (Figure 1). Unlike the steel t-posts and geo-textile fabric used the previous year, the new length of drift-fence was constructed from standard plastic-weave silt fencing material with attached wooden stakes. The fence was buried a minimum 6 inches into the ground and extended 2 - 3 feet above the ground surface. A total of 108 plastic landscape pots, ranging in size from 1 to 5 gallons were installed approximately every 50 feet along the inside of enclosures A and B, and approximately every 100 feet along the outside of the section of enclosure A closest to the existing stock ponds, for a total of 83 inside traps and 25 outside traps. Plywood covers and bricks were used to close the traps when not in use.

Monitoring was first conducted on 8 January 2001. Traps were opened during the late afternoon on rainy days or when rain was predicted for that night, then checked the following morning, and closed if no further rain was expected, or left open if rain was in the forecast. The fence line and traps were regularly maintained during monitoring, as well as when the traps were not opened for a minimum 1-week period due to the lack of rainfall. All amphibians captured were identified and recorded. CRFs captured were measured, photographed and released into adjacent suitable habitat, away from the work area (i.e., adjacent drainages). All California newts (*Taricha torosa*) captured were released in downed woody debris (e.g., logs) within the adjacent oak woodland to the north of the work area. Rainfall data during the study was obtained from the nearby Coit Station operated by the SCVWD. Preliminary information on CTS movement patterns at Lake Lagunita, on the Stanford University campus, and UC Hastings Reserve, in Carmel Valley, was obtained for general comparison purposes.

All traps were removed on 26 March, for the following reasons: (1) the peak of the CTS breeding season was presumed to be over; (2) the lack of CTS captured during the two-year study period; and (3) the lack of rainfall over the last 3 weeks in March. Table 1 and Figure 2 summarize the monitoring data.

RESULTS

SCVWD Tunnel Landslide

The 108 traps were monitored for 25 nights between 8 January and 26 March 2001, for a level of effort at 2,700 trap-nights. Through the course of the monitoring study, regular cattle damage along the new section of drift-fence reduced the effectiveness of the trapline by creating opportunities for trespass into enclosure B. Also, several traps along the new fence-line were occasionally ineffective due to flooding and/or sedimentation.

California newt was the most abundant species recorded during the study, with a total of 852 captured (Table 1). Of this total, 452 were collected outside of the enclosure, and 400 inside of enclosures A and B (i.e., 201 for enclosure A, 199 for enclosure B). These figures represent a 47% decrease in the numbers of newts captured from the previous season, when a total of 1,579 were captured, 540 inside of the enclosure. Figure 2 shows a highly variable trend of newts captured as the season progressed, with the peak numbers early in the season, followed by lower numbers, but no prominent decreasing trends (Table 1). Peak numbers of newts for outside traps and inside enclosure A occurred on 11 January, when 42 and 36 were captured, respectively. While the peak number of newts for inside enclosure B occurred on 12 January, when 24 were captured. The overall pattern of newt captures in 2000-01 differs noticeably from the previous year, when numbers were less variable and showed an overall decreasing trend.

Only one sub-adult sized CRF was captured in the pitfall traps on 4 March, and was photographed, measured and released into dense vegetation within the drainage channel immediately to the south of the fence enclosure (Figure 1). The CRF measured 4.5 cm snout-urostyle length. The capture location was in the vicinity of the access road/fence-line intersection, where three CRF were captured the previous year (Figure 1).

Other amphibians captured during the study included Pacific slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), ensatina (*Ensatina ensatina xanthoptica*) and Pacific treefrog (*Hyla regilla*).

Other CTS Studies

Preliminary data from both Lake Lagunita (Stanford University campus) and UC Hastings Reserve (northern Monterey County) indicate that the level of CTS movement at these sites during the 2000-01 winter was similar to the previous winter, when lower numbers of CTS were observed compared to previous years (A. Launer, pers. comm.; W. Koenig, pers. comm.). The relative lack of heavy precipitation in November and December may have influenced the overall level of CTS movement during the breeding season, but did not preclude CTS movement.

DISCUSSION

California Tiger Salamander

Over the past two years of monitoring, only one adult CTS was captured, despite the addition of approximately 1000 feet of trap-line during the 2000-01 study. This result strongly suggests that the number of CTS within the landslide work areas is very small, and that the study area population may be on the verge of becoming extirpated. The capture of only a single CTS during the two-year study is especially surprising, given the close proximity of the fence line to the two perennial stock ponds, and the fact that two adults were observed on a single visit, during winter nocturnal surveys of the project area during the 1998-99 winter (BMBCS 1999). Although the 2000-01 study did not start until January, and missed the early fall rains when juveniles are most likely to disperse, CTS observations at Lake Lagunita and UC Hastings Reserve suggest that, at least throughout parts of this species range in central-coastal California, rainfall patterns from January - March (the study period) were sufficient to illicit CTS movement to breeding ponds. Therefore, if present within the landslide work areas, the trapping effort should have resulted in CTS captures this year, especially along the lowest section of the fence line, adjacent to the two ponds, which appear to be the only potential breeding ponds within the sub-watershed of the study site.

A major factor that may be influencing the numbers of CTS in the study area is the abundance of bullfrogs (*Rana catesbeiana*) at the two adjacent ponds (BMBCS 1999). Bullfrogs are considered a threat to the persistence of CTS and other native amphibian populations (Shaffer *et al* 1993; Morey and Guinn 1992). Bullfrog predation of CTS adults and metamorphs could be adversely impacting the CTS population on the site.

Another hypothesis for the low numbers of CTS recorded over the past two years is that the two adjacent perennial ponds are not CTS breeding ponds, and that the three CTS recorded between 1999-2000 were from another breeding population within dispersal distance to the project site (i.e., within 1 km of the site). This scenario would account for the overall lack of CTS captured during the two year drift-fence study.

Reoccurring cattle damage to the fence line is not considered a major factor in the absence of CTS captured this year, since: (1) trapping effort was high (2,700 trap nights); (2) the results are consistent with the previous year's results, when only one CTS was captured; and (3) newts were captured in high numbers despite damage to fences.

California Newt

The overall lower numbers of newts captured during this study than in the previous year was expected and consistent with the overall goal of the monitoring program - to minimize amphibian movement into and to extract amphibians out from the landslide work areas. However, the 201 newts captured in enclosure A was surprising and higher than expected, given that the number of newts captured within the enclosure at the end of the previous year's study was down to 4. The relatively high number of newts caught within enclosure A this year could have been due to a combination of factors, including: (1) trespass into the enclosure via cattle damage along the fence line, which was not repaired until after the fall rains, when newts were likely beginning to disperse; (2)the high density of newts within the enclosure; and/or (3) annual variation in the movement patterns of individuals (i.e., some adults may not migrate every year).

RECOMMENDATIONS

The capture of only one adult CTS over the past two years of monitoring suggests that the landslide work areas are not likely important upland refuge for adult and juvenile CTS. Under this presumption, the proposed earth-moving activities within the work areas are not expected to result in significant impacts to the local CTS population. No further trapping for CTS seems warranted at this time.

Implications of the Results of Newt Captures Regarding the Efficacy of Drift Fence Extraction Programs

Despite the fact that 540 newts were captured and removed from the interior of the enclosure the previous year, 201 newts were captured from this same enclosure (enclosure A) this winter. Of the 201 newts, some were likely individuals which moved into the enclosure through cattle damage along the fence lines or through the three openings in the fence line (e.g., two at access road crossings; one due to steep slopes). However, another likely presumption which could account for the relatively high number of newts is that a portion of the population which inhabited the enclosure area simply were not captured the previous year, perhaps, because they did not move far from their upland refugia. Annual variation in individual movement patterns for newts is consistent with their life history characteristics, as this species is long-lived and individuals may take from 5 to 8 years to reach sexual maturity (Petranka 1998). Under this presumption, drift-fence salvage measures need to consider multiple years (i.e., minimum of two years) of monitoring to ensure that adequate depletion of amphibian species with similar life history characteristics to newts, such as CTS, has been achieved.

If you have any questions or comments regarding this letter-report, please call me anytime.

Sincerely,

Bryan Mori
Wildlife Consultant

cc: Martha Schauss, CDFG; Curtis McCasland, USFWS; Peter Taormina, MPE.

REFERENCES\PERSONS CONTACTED

BMBCS. 2000. Santa Clara Valley Water District Tunnel Landslide 1999 - 2000 Winter California Tiger Salamander Pitfall Trap Monitoring; File No. 142-01. Letter-report prepared for Dames and Moore.

BMBCS. 1999. Santa Clara Valley Water District Tunnel Landslide Winter California Tiger Salamander Surveys. Prepared for Dames and Moore.

Jennings, M. R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Concern in California. California Department of Fish and Game.

Morey, S. R. and D. A. Guinn. 1992. Activity Patterns, Food Habits, and Changing Abundance in a Community of Vernal Pool Amphibians. *In* D. F. Williams, S. Byrne, and T. A. Rado (eds.) Endangered and Sensitive Species of the San Joaquin Valley, California: Their Biology, Management and Conservation. The California Energy Commission and the Western Section of the Wildlife Society.

Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington.

Shaffer, H. B., Fisher, R. N. and Stanley, S. 1993. Status Report: The California Tiger Salamander Ambystoma californiense. Zoology Department, U.C. Davis.

Personal Communications:

Alan Launer, Center for Biological Conservation, Stanford University.
Walter Koenig, UC California Hastings Reserve, Carmel Valley.

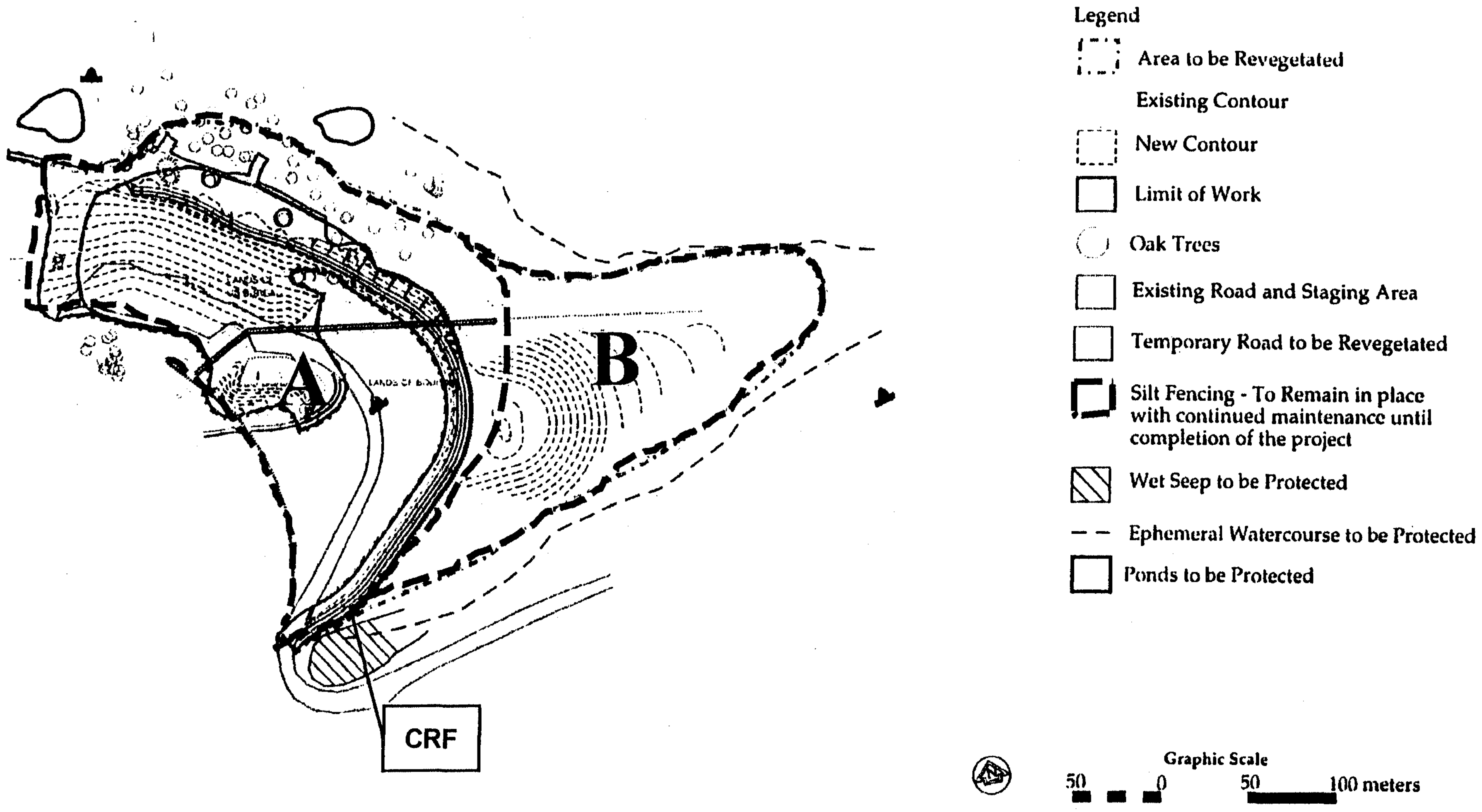
A
B
CRF
Legend
Area to be Revegetated
Existing Contour
New Contour
Limit of Work
Oak Trees
Existing Road and Staging Area
Temporary Road to be Revegetated
Silt Fencing - To Remain in place with continued maintenance until completion of the project
Wet Seep to be Protected
Ephemeral Watercourse to be Protected
Ponds to be Protected
Graphic Scale
50
0
50
100 meters

Figure 1. SCVWD Tunnel Landslide Project Site (Source: MPE).

Bryan Mori Biological Consulting Services

Figure 2. Ca. Newt Pitfall Captures
Winter 2000-2001

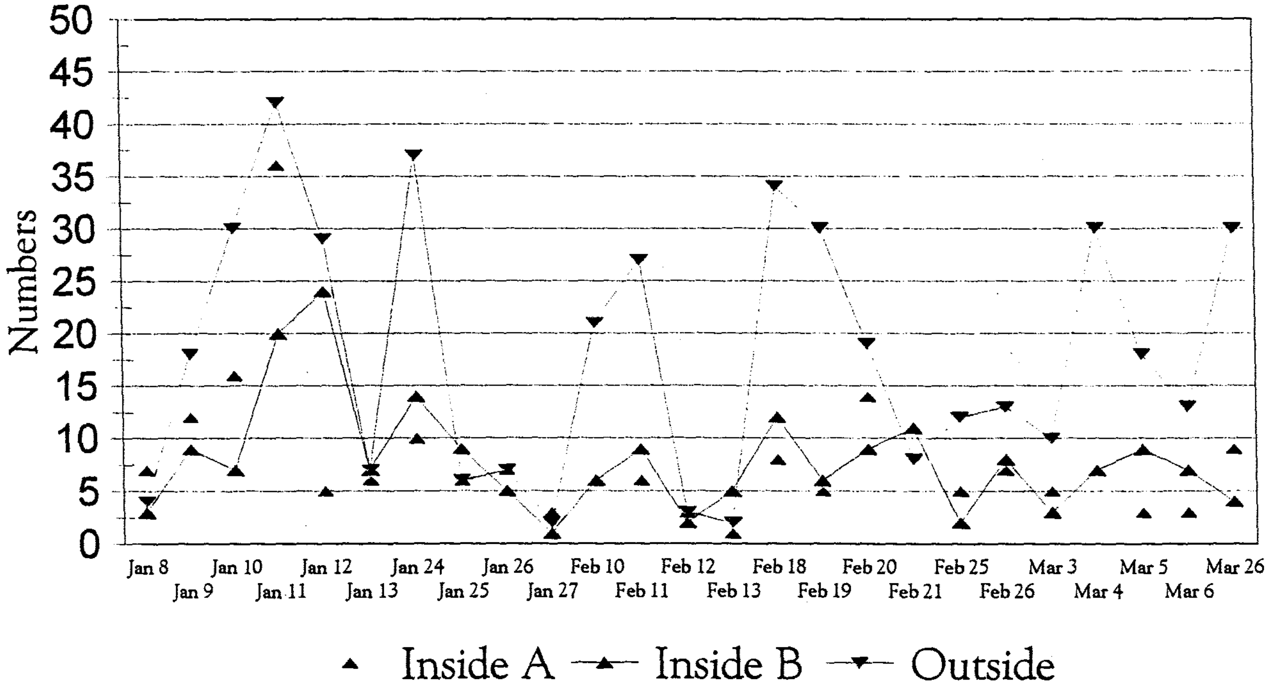

Table 1. Summary of Pitfall Trap Captures, Winter 2000 - 2001, Bourdet Ranch, Santa Clara County.

Date	CN	CRF	Precip.*
Jan 8	14		0.28
Jan 9	39		0.00
Jan 10	53		1.38
Jan 11	98		0.63
Jan 12	58		0.12
Jan 13	20		0.00
Jan 24	61		0.39
Jan 25	21		1.02
Jan 26	19		0.04
Jan 27	6		0.00
Feb 10	33		1.10
Feb 11	42		0.79
Feb 12	8		0.35
Feb 13	8		0.00
Feb 18	54		0.00
Feb 19	41		0.79
Feb 20	42		0.08
Feb 21	30		0.04
Feb 25	19		0.91
Feb 26	28		0.08
Mar 3	18		0.31
Mar 4	44	1	1.02
Mar 5	30		0.28
Mar 6	23		0.04
Mar 26	43		**0.16
Total	852	1	

* = 24-hr total inches; SCVWD Coit Station;** = previous day
CN = California newt; CRF = California red-legged frog